



A CLINICAL STUDY TO CORRELATE LOWER URINARY TRACT SYMPTOMS DUE TO BENIGN PROSTATIC HYPERPLASIA WITH THE PROSTATE VOLUME AND THE INTRAVESICAL PROSTATIC PROTRUSION

Urology

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ABSTRACT

Introduction: International Prostate Symptom score (IPSS) which is identical to AUA symptom index, is recommended as a symptom scoring instrument to be used for baseline assessment of symptoms severity in men presenting with Lower Urinary Tract Symptoms. The correlation of prostate volume PV, IPP and IPSS has been extensively investigated. It was generally accepted that there was weak correlation of PV with IPSS and strong correlation of IPP with IPSS. We conducted this study to find out whether this generally accepted correlation holds true for our patients from north east region of india

Materials and Methods: This was a prospectively designed study conducted in the department of Urology, Regional institute of medical sciences imphal to correlate lower urinary tract symptoms due to benign prostatic hyperplasia with prostate volume and intravesical prostatic protrusion. A total of 154 patients of BPH were included in the study. Statistical analysis was done by using IBM SPSS Version 21 for windows. Chi square test/fischer exact test was used as a test of significance of the study for comparing the outcome variables. P-value <0.05 was taken as significant. Spearman correlation coefficient for categorical data and Pearson's correlation coefficient analysis for continuous variables was carried out

Results and Observations: In our study maximum number of patients were in the moderate IPSS grade category 89 patients (58.00%) were having moderate symptoms, 55 patients (36.0%) were having severe symptoms and 10 patients (6.0%) were having mild symptoms. There was statistically significant and strong correlation between intraprostatic protrusion and International Prostate Symptoms Score with ('p' value <0.0001 and r = 0.78). There was statistically significant and strong correlation between Prostate volume (PV) and International Prostate Symptoms Score with ('p' value <0.001 and r = 0.56).

Conclusion: This study concludes that both IPP and PV have strong correlation with symptoms of BOO measured by IPSS. IPP is easy to acquire and non invasive. IPP can also help in predicting some times the high IPSS score despite of a small prostate volume

KEYWORDS

INTRODUCTION

Benign prostatic hyperplasia (BPH) is one of the commonest diseases of ageing men. The prevalence of histological BPH increases with age and occurs in approximately 40% of men aged 50-60 years and in approximately 90% of men aged more than 80 years. It can be associated with bothersome lower urinary tract symptoms (LUTS) that affect quality of life and it also causes structural and functional changes in the bladder.^{1,2}

Intravesical Prostatic Protrusion (IPP) is a morphological change due to overgrowth of prostatic median and lateral lobes into the bladder and may lead to dyskinetic movement of bladder during voiding.³ Progression depends not only on the size but also the shape of the prostate adenoma which causes obstruction, hence, the importance of studying the relationship between LUTS with prostate volume (PV) and intra vesical prostatic protrusion (IPP). IPP can be measured noninvasively by Trans Abdominal Ultrasonography (TAUS) as vertical distance from intravesical protruding prostatic tip to the imaginary bladder neck line in the midline sagittal.^{5,6,7,8} The IPP can predict voiding parameters for determining BOO in men who present with LUTS. IPP may also be a useful predictor for clinical progression in men with benign prostatic hyperplasia (BPH). IPP which distorts the funneling effect of the bladder neck can be considered to represent the obstructive effect of the prostate.^{4,5,6,7}

International Prostate Symptom score (IPSS) which is identical to AUA symptom index, is recommended as a symptom scoring instrument to be used for baseline assessment of symptoms severity in men presenting with Lower Urinary Tract Symptoms (LUTS).^{8,9,10}

The correlation of prostate volume PV and IPSS has been extensively investigated. It was generally accepted that there was weak correlation of PV with IPSS. However, several recent studies indicated a stronger correlation between PV and IPSS than previously reported.^{11,12,13,14}

Several studies have previously demonstrated that the ultrasonographic measurement of IPP is able to correlate with BOO in BPH patients quickly and non-invasively.¹⁵

The purpose of the present study is to determine the relation between IPSS in BPH with PV and IPP.

MATERIALS & METHODS:

Patients eligibility

This study was conducted by the department of urology, Regional Institute of Medical Sciences, Imphal over a period of 2 years from December 2018 to November 2020, after obtaining approval from the institutional ethics committee. Prospectively patients of Benign Prostatic hyperplasia (BPH) with Lower Urinary Tract Symptoms (LUTS) were screened after obtaining written informed consent in a language in which the patients were fluent to read and understand. Patients with LUTS due to other causes as Diabetes mellitus, neurogenic disease and stricture urethra etc were excluded from the study. Patients with known prostatic carcinoma and who undergone previous prostatic surgery were also excluded.

Evaluation

The International Prostate Symptoms Score (IPSS) was used to assess the severity of LUTS and quality of life (QOL) index was used to evaluate if the symptoms were bothering the patients. Medical history taking and physical examination were performed. Digital rectal examination (DRE) was performed to exclude prostate cancer, and a neurological examination was performed to exclude neurogenic bladder dysfunction.

International Prostate Symptom Score							
Patient Name:	Date of birth:			Date completed:			
	Not at All	Less than 1 in 5 Times	Less than Half the Time	About Half the Time	More than Half the Time	Almost Always	Your score
1. Incomplete Emptying How often have you had the sensation of not emptying your bladder?	0	1	2	3	4	5	
2. Frequency How often have you had to urinate more than every two hours?	0	1	2	3	4	5	
3. Intercontinence How often have you found you leaked or started again several times when you urinated?	0	1	2	3	4	5	
4. Urgency How often have you found it difficult to postpone urination?	0	1	2	3	4	5	
5. Weak Stream How often have you had a weak urinary stream?	0	1	2	3	4	5	
6. Straining How often have you had to strain to start urination?	0	1	2	3	4	5	
7. Nocturia How many times did you typically get up at night to urinate?	None	1 Time	2 Times	3 Times	4 Times	5 Times	
Total IPSS Score							
Score	1-7: Mild			8-19: Moderate		20-35: Severe	
Quality of Life Due to Urinary Symptoms							
	Excellent	Good	Moderately Satisfied	Mixed	Moderately Dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	0	1	2	3	4	5	6

Prostate gland was evaluated by TAUS with 3.5 mHz curvilinear probe (sonace X) with partially distended bladder for the echotexture, morphology, focal lesions, PV, IPP. PV was calculated using Prostate ellipsoid formula (Antero-posterior diameter $\times$ Transverse diameter $\times$ Cranio-caudal diameter $\times 0.52$). The degree of IPP was graded by measuring the vertical distance from intravesical protruding prostatic tip to the imaginary bladder neck line in the midline sagittal. The degree of IPP was classified as follows: Grade 1: 5 mm or less; Grade 2: more than 5 to 10 mm; Grade 3: more than 10 mm. Bladder volume approximately 150-250 ml while assessing the IPP. Urinary bladder, ureter and kidney to be accessed in totality.

Results:

Baseline characteristics of the study has been described in table 1. Mean age in our study was 63.34 ± 8 years (range 41-86), mean prostate volume 48 ± 14 cc with minimum PV of 16cc and maximum of 108, mean intravesical prostatic protrusion of 6.32 ± 3.2 mm (range 0-17mm). Mean IPSS of this study was 14 with a standard deviation of 6 with minimum symptom of score 6 and maximum of 33.

Table 1: Baseline clinical characteristic of study (n=154)

	Mean	Standard deviation	Minimum	Maximum
Age (years)	63.34	8	41	86
PV(cc)	48	14	16	108
IPP(mm)	6.3	3.2	0	17
IPSS	14	6	6	33

Table 2 and figure 1 shows statistically significant and strong correlation between prostate volume (PV) and International Prostate Symptoms Score with ('p' value <0.001 and $r=0.56$). This indicates that larger prostate there is increase in the symptoms severity. A positive weak correlation was also found between PV and QOL (p value <0.001 and $r=0.34$). There was no statistically significant correlation found between PV and age ($r=0.14$, $p=0.08$).

Table 2: Correlation of prostate volume with IPSS

IPSS Grading	N	Mean prostate volume in cc.	Standard Deviation	'r' value	'p' value
Mild	10	24	6.34	0.56	<0.001
Moderate	89	41	10.4		
Severe	55	64	17.4		

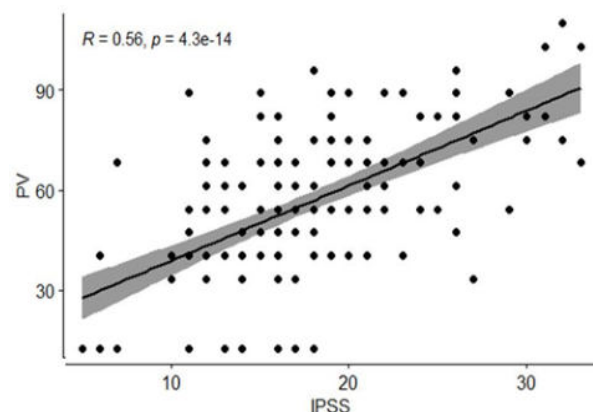


Figure 1 : Scattered plot diagram for correlation between PV and IPSS

Table 3 and figure 2 showed that there was a statistically significant and strong correlation between intravesical prostatic protrusion and International Prostate Symptoms Score with ('p' value <0.001 and $r=0.78$). This indicates that when there is median lobe enlargement there is increase in the symptoms severity. A positive weak correlation was found between IPP and QOL (p value <0.001 and $r=0.45$). There was no statistically significant correlation found between IPP and age ($r=0.13$, $p=0.08$).

Table 3 : Correlation of IPP with IPSS

IPSS Grading	N	Mean IPP value	Standard Deviation	'r' value	'p' value
Mild	10	1.2	3.23	0.78	<0.0001
Moderate	89	5.7	3.23		
Severe	55	8.3	2.59		

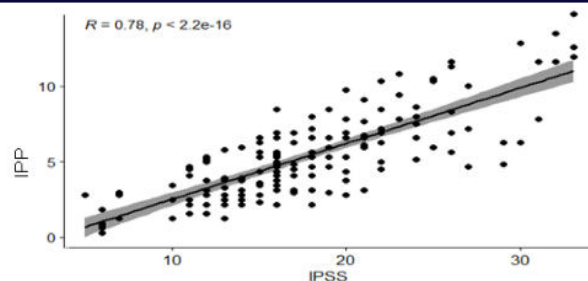


Figure 2: Scattered plot diagram for correlation between IPP and IPSS

DISCUSSION:

Benign prostatic hyperplasia (BPH) is a cause of increased morbidity and burden in ageing men due to frequently associated lower urinary tract symptoms (LUTS), the LUTS may impair quality of life. BPH is also a progressive disease, mainly characterized by a deterioration of LUTS over time.

A total of 154 male patients older than 40 years with clinical history of lower urinary tract symptoms but not known cases of prostatic carcinoma or previous history of prostatic surgery were included in the study. In this study attempts were made to find correlation between prostatic volume and intraprostatic protrusion assessed by transabdominal ultrasonography, and clinical symptom score graded by International Prostate Symptom Score.

In our study maximum number of patients were in the moderate IPSS grade category 89 patients (58.00%) were having moderate symptoms, 55 patients (36.0%) were having severe symptoms and 10 patients (6.0%) were having mild symptoms. A study by Overland et al. showed 23.6% of the patients had moderate symptoms and 5% of the patients had severe symptoms. In our study there was much higher IPSS severity than this study. Study by Tay et al. All¹⁶ on 799 patients there were 67.6% of patients with IPSS of more than 8. Whereas in our study 94% of patients had IPSS score more than 8. In our study the probable cause for more number of patients with higher IPSS severity may be due to late presentations and due to the habit of postponing health solutions. Also the sample size taken in our study was small as compared to those studies.

There was statistically significant and strong correlation between intraprostatic protrusion and International Prostate Symptoms Score with ('p' value <0.0001 and $r=0.78$). This indicates that when there is median lobe enlargement there is increase in the symptoms severity. A positive weak correlation was found between IPP and QOL (p value <0.001 and $r=0.45$). There was no statistically significant correlation found between IPP and age ($r=0.14$, $p=0.08$). The results are similar to results found by Lieber et al¹⁷ their findings are IPP was significantly correlated with greater prostate volume, higher obstructive symptoms, and lower peak urinary flow rates. Shin et al²⁸ retrospectively evaluated 239 patients with BPH, analyzing age, IPP, prostate volume, International Prostate Symptom Score (IPSS), and the results from a pressure-flow study and found that IPP exceeding 5.5 mm was significantly associated with BOO. Qmax, PVR, prostatic volume, and IPP had significant predictive value for BOO (p=0.026, p<0.001, p<0.001, and p<0.001, respectively).

There was statistically significant and strong correlation between Prostate volume (PV) and International Prostate Symptoms Score with ('p' value <0.001 and $r=0.56$). This indicates that when there is prostatic enlargement there is increase in the symptoms severity. A positive weak correlation was found between PV and QOL (p value <0.001 and $r=0.34$). There was no statistically significant correlation found between IPP and age ($r=0.13$, $p=0.095$). Results are similar to studies conducted by Basawaraj NG et al¹⁸, which found statistically significant but no correlation between the prostate volume (PV) with age ($r=0.19$, $p=0.03$), quality of life ($r=0.28$, $p=0.002$). Prostate volume had statistically significant but with weak correlation observed with IPSS ($r=0.40$, $p=0.001$). According to Overland B et al¹⁹ positive modest correlation noted between IPSS and prostate volume. Another study by Tsukamoto et al²⁰ showed that a change in IPSS was associated with a change in prostate volume, whereas study by Agrawal et al²¹. Sanjeev singla et al, Udeh et al, and Ezz et al. showed no relationship between prostate size and IPSS score.^{22,23}

CONCLUSION:

This study concludes that both IPP and PV have strong correlation with symptoms of BOO measured by IPSS. Both PV and IPP need to be considered when managing a patient of BPH with LUTS.

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